

IN THE CLAIMS:

- 006120-2650960
1. Steering shaft universal double joint for motor vehicles with shaft ends (1, 2) fastened against rotation in the joint, these ends being held for movement in a housing (8) joining the two joints (9) and the shaft ends (1, 2) being joined together between the two joints by a ball joint (5, 7) so that the ball (5) is mounted for rotation about its center point in a socket (7) of the other shaft end (1) and is slidably movable in the direction of the shaft axis (3) of the other shaft end (2), characterized in that the ball (5) is resiliently mounted (11, 37) in the socket (7).
  2. Joint according to claim 1, characterized in that the socket (7) is formed as a resiliently mounted bushing (11), and the bushing (11) is preferably mounted resiliently in the socket (7) for tumbler movement.
  3. Joint according to claim 2, characterized in that the bushing (11) is held by a tumbler guide (30), the bushing (11) being preferably enveloped at least partially by the tumbler guide.
  4. Joint according to any one of the foregoing claims, characterized in that the mounting is performed with metal springs (31), preferably with plate springs (31).

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5. Joint according to any one of the foregoing claims, characterized in that the mounting is performed with elastomeric spring pads, preferably with annular pads between washers of, for example, metal.
  6. Joint according to claim 4, characterized in that the plate springs (31) are biased against the tumbler guide (30), so that the shaft axis (30) when in the unstressed position, is aligned with the axis of the tumbler guide (30).
  7. Joint according to any one of the foregoing claims, characterized in that the bushing (11) consists of a sintered metal, preferably with a supporting sleeve or a lubricant coating.
  8. Joint according to any one of the foregoing claims, characterized in that the bushing (11) is slotted such that it is resiliently movable in the radial direction.
  9. Joint according to any one of the foregoing claims, characterized in that the bushing (11) envelops the ball in a wear- and tolerance-equalizing manner in any working position, the bushing (11) being installed in the tumbler guide (7, 30) with clearance approaching zero.

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10. Joint according to any one of the foregoing claims, characterized in that in the end portion of the fork (6) an annular chamber (34) is formed to accommodate pre-biased resilient means (31), the latter being disposed between a first abutment (35, 41) on the fork side and a second abutment (33) on the tumbler guide (30), so that the tumbler guide (30) can tumble resiliently about the shaft axis in case of radial action by a force.
11. Joint according to any one of the foregoing claims, characterized in that the bushing (11) is held in the axial direction at at least one end by the tumbler guide (30), preferably by a rim (32) or by claws (32, 1).
12. Joint according to any one of the foregoing claims, characterized in that between the bushing (11) and the tumbler guide (30) a plastic sleeve (36), preferably slotted and tapered, and preferably of POM is provided, and it is preferably under pressure by a spring 31.1
13. Joint according to any one of the foregoing claims, characterized in that between the sleeve-like socket (7) and the ball (5) a plastic sliding guide (37) is provided such that it receives the ball (5) for rotational movement and is carried for sliding movement in the axial direction by the socket, the guide (37) being preferably injection-molded directly onto the ball (5).

14. Joint according to claim 13, characterized in that the socket (7) has spring-finger-like means on its circumference and resiliently grips the plastic sliding guide (37) between ball (5) and socket (7).
15. Joint according to claim 13 or 14, characterized in that the plastic sliding guide (37) is enveloped in the outer wall area by a pre-biased plastic spring (39) which slides in the socket (7, 30), this spring (39) preferably having slots (40) in its circumference, so that it can breathe in the radial direction.
16. Steering shaft universal joint for motor vehicles with shaft ends (1, 2) held against rotation in the joint, which are mounted for movement in a housing (8) joining together the two joints, and the shaft ends (1, 2) being joined together between the two joints by a ball joint (5, 7), so that the ball (5) at the one shaft end (2) is mounted in a socket (7) of the other shaft end (1) for rotation about its center and is mounted in the direction of the shaft axis (3) of the other shaft end (2), characterized in that on the inner wall of the housing (8) an abutment means (13, 14) are provided for the ball (5) and the socket (7).

17. Joint according to claim 16, characterized in that the abutment means (13, 14) are so configured that the ball (5) and the socket (7) define the given allowable positions in all extreme joint deflections and in the case of assembly, the means (13, 14) being so configured that in case of abutment first the socket (7) and then the ball (5) makes contact.
18. Use of the abutment means according to claim 16 or 17 in a joint according to any one of claims 1 to 15.
19. Joint according to any one of the foregoing claims, characterized in that the universal joint contains a homokinetic joint, such as a constant velocity joint and/or preferably a cross joint.

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